

Loftsome Bridge WTW Ozone Plant



Figure 1: Loftsome Bridge WTW 2 x 9.5 kg ozone/h and vent ozone destructors

In 1994 Yorkshire Water Services and Ozonia installed ozonation facilities at the Loftsome Bridge Water Treatment Works in East Yorkshire. This plant treats water drawn from the River Derwent into a bankside storage reservoir. It has been installed primarily for pesticide removal and algae control to enhance the slow sand filters without the need for expensive GAC.

Ozonia undertook to design, manufacture, supply and install the ozone plant and all of the associated mechanical, electrical and instrumentation

equipment to provide a fully operational plant.

In order to double the maximum throughput the water works at Loftsome Bridge has undergone a major enhancement, of which the ozonation process forms a significant part.

Ozone is dosed before the rapid gravity filters primarily for pesticide removal. This preozonation is also used to enhance diatom removal and improve turbidity removal. Due to the challenging quality of the water Ozonia's patented radial diffusers are used which,

unlike porous diffusers, will not clog.

The plant consists of two ozone generators each rated at 9.5 kg/h of ozone at 6wt% concentration in oxygen, which operate as duty/standby.

The plant is fully automatic with a supervisory Programmable Logic Controller (PLC) as the central control and local "distributed" control at each of the main pieces of equipment. The main PLC controls the sequenced operation of all the plant items, while local logic systems supervise the operation of these items.

Each ozone generator has its own Power Supply Unit (PSU) which is a three phase six pulse system feeding a single phase output through a 10 kV transformer at a frequency of 700 Hz. The ozone is dosed as a function of process water flow.

The duty/standby Vent Ozone Destruction system (VOD) is of the thermal type with a heat recovery system to economise on electrical power. The destructors reduce ozone emission levels to well below the required limits. The spent gases are vented to atmosphere.

Since startup the plant has performed excellently. More details can be found in the paper "Uprating Barmby WTW" by D. Wilson in 'Advances in Slow Sand and Alternative Biological Filtration' (Graham N. & Collins R., Ed.), John Wiley & Sons, Chichester, 1996, pp 438-448.

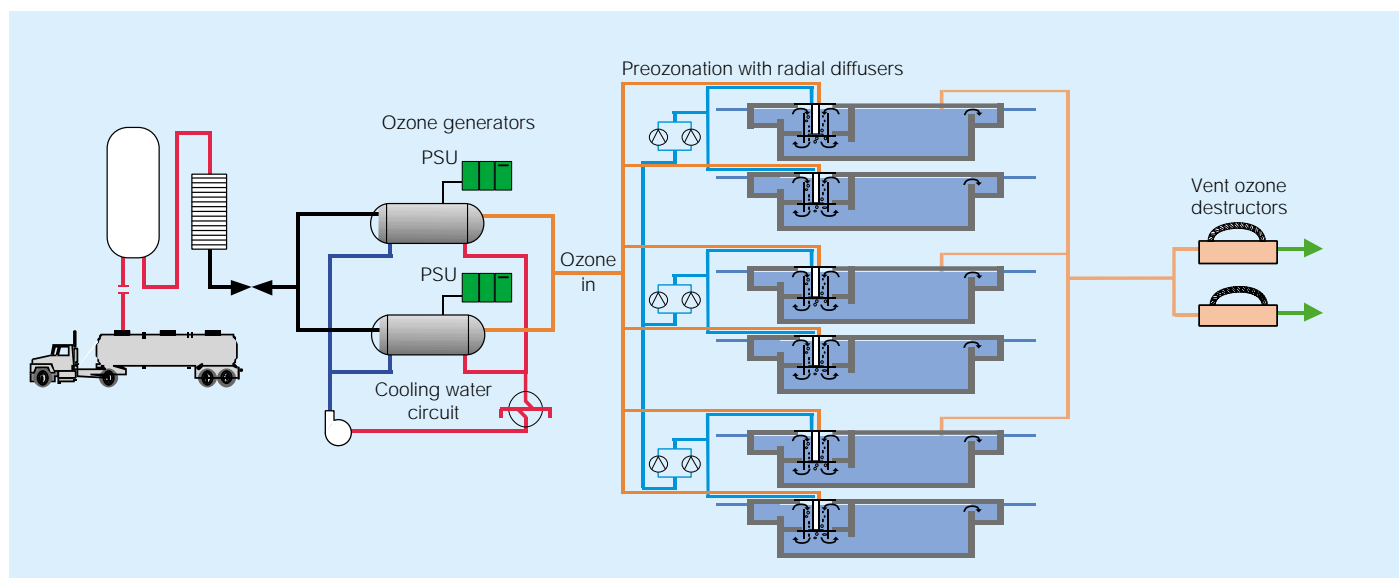


Figure 2: Ozone plant process diagram

Loftsome Bridge WTW

Water Source: Reservoir fed from the River Derwent

Treatment Process: Ferric sulphate dosing
Preozonation
Rapid gravity filters
Covered slow sand filters
Disinfection (Chlorine)
Distribution

Ozone Use

Preozonation: Pesticide removal and enhancement of the rapid gravity filters by improved diatom and turbidity removal. Also removal of colour from the final water, and increasing the useful life of the slow sand filters.



Figure 3: Contact tank with radial diffusers



Figure 4: Cooling water system

Plant Statistics

Flow: 110 ml/d
Preozone dose: 2 mg/l
Ozone demand: 9.5 kg/h
Number of generators: 2 rated at 9.5 kg/h each (maximum) (10-100%)
Feed Gas: Oxygen
Ozone concentration: 6 wt%
Power Supply Unit: Medium frequency - 6 pulse
Contact system: Preozonation,
Radial diffusers
Vent gas treatment: 2 off thermal vent ozone destructors with heat recuperation
Control: Fully automatic plant, PLC controlled with Manual override.

Plants supplied to Yorkshire Water Services by Ozonia

Loftsome Bridge and Headingley.

Client

Yorkshire Water Services Limited
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Western House
Halifax Road
Bradford BD6 2LZ
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Site

Loftsome Bridge WTW
Loftsome Bridge
Wressle, Selby YO8 7EN
United Kingdom

Contract

Contract awarded: September 1992
Contract take-over: December 1994



Figure 5: Ozone generators

Ozonia Scope of Supply

Ozone generation
Ozone contacting
Vent ozone destruction
Cooling water system
Piping, valves and instrumentation
Electrics & controls
Design, manufacture, supply,
erection and commissioning

OZONIA

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